

### Claim Amendments

Claim 1 (previously presented): A data storage system comprising:

N servers, where  $N \geq 2$  and is an integer;

D disks, where  $D \geq 2$  and is an integer, each server in communication with each disk, each disk having a reserved disk block for each of the N servers; and

a disk arbitration mechanism that uses a timestamp-based voting algorithm over the disk blocks associated with the servers to exchange votes for a primary server, the primary server arbitrating access of the servers to a set of disks of the D disks, where a set of the disk blocks are used as a communication medium.

Claim 2 (canceled)

Claim 3 (previously presented): A system as described in Claim 1 wherein each server has an index.

Claim 4 (original): A system as described in Claim 3 wherein the disk arbitration mechanism causes each server at first predetermined times to read all of the disk blocks, and write its own disk block to determine which server has access to, and use and control of the disks at a given time.

Claim 5 (original): A system as described in Claim 4 wherein each server includes a state machine and a local RAM, and maintains in local RAM a last time at which each servers' state changed and a value associated with the state when it last changed.

Claim 6 (original): A system as described in Claim 5 wherein each server determines which of the other servers are operating by identifying which of the other servers had their state change during second predetermined times.

Claim 7 (previously presented): A method for storing data comprising the steps of:

writing by N of servers into each servers' own associated disk block in each disk of D disks its state, where  $N \geq 2$  and  $D \geq 2$  and are integers; and

reading by each server all the other servers' disk blocks in each disk in order to determine which server has access to, and use and control of the disks at a given time by using a timestamp-based voting algorithm over the disk blocks associated with the servers to exchange votes for a primary server, the primary server arbitrating access of the servers to a set of disks of the D disks, where the set of the disk blocks are used as a communication medium.

Claim 8 (original): A method as described in Claim 7 wherein the reading step includes the step of performing a voting protocol to determine which server has access to, and use and control of the disks at a given time.

Claim 9 (original): A method as described in Claim 8 including after the reading step, there are the steps of determining which server becomes a winning server and has access to, and use and control of the disk at a given time; and accessing the disk exclusively by the winning server.

Claim 10 (original): A method as described in Claim 9 wherein the accessing step includes the step of transmitting by the winning server its state from not winning to winning and invalidating by the winning server all caches of the winning server.

Claim 11 (original): A method as described in Claim 10 wherein the writing step includes the step of assigning an index to each server.

Claim 12 (original): A method as described in Claim 11 wherein the reading step includes the step of reading at predetermined times by each server all disk blocks and writing its own respective disk block.

Claim 13 (original): A method as described in Claim 12 wherein the writing step includes the step of maintaining by each server in each servers' own local RAM a last time for each other server when each other servers' status changed and a value of a status counter at the last time.

Claim 14 (original): A method as described in Claim 13 wherein the reading step includes the step of determining by each server which of the other servers are operating by declaring that each of the other servers whose status has changed within a last predetermined time period is operating.

Claim 15 (original): A method as described in Claim 14 wherein the reading step includes the step of voting by the servers that are up for a winning server that is up and believes it is the winning server.

Claim 16 (original): A method as described in Claim 15 wherein the reading step includes the step of voting for the server that is up and has a lowest index if no server believes it is the winning server.

Claim 17 (previously presented): A method for storing data comprising the steps of:

writing by N of servers into each servers' own associated disk block in each disk of D disks its state, where  $N \geq 2$  and  $D \geq 2$  and are integers; and

reading by each server all the other servers' disk blocks in each disk in order to determine which server has access to, and use and control of the disks at a given time;

determining which server becomes a winning server and has access to, and use and control of the disk at a given time;

accessing the disk exclusively by the winning server; and

transmitting by the winning server its state from not winning to winning and invalidating by the winning server all caches of the winning server.

Claim 18 (previously presented): A method as described in Claim 17 wherein the writing step includes the step of assigning an index to each server.

Claim 19 (previously presented): A method as described in Claim 18 wherein the reading step includes the step of reading at predetermined times by each server all disk blocks and writing its own respective disk block.

Claim 20 (previously presented): A method as described in Claim 19 wherein the writing step includes the step of maintaining by each server in each servers' own local RAM a last time for each other server when each other servers' status changed and a value of a status counter at the last time.

Claim 21 (previously presented): A method as described in Claim 20 wherein the reading step includes the step of determining by each server which of the other servers are operating by declaring that each of the other servers whose status has changed within a last predetermined time period is operating.

Claim 22 (previously presented): A method as described in Claim 21 wherein the reading step includes the step of voting by the servers that are up for a winning server that is up and believes it is the winning server.

Claim 23 (previously presented): A method as described in Claim 22 wherein the reading step includes the step of voting for the server that is up and has a lowest index if no server believes it is the winning server.

Claim 24 (previously presented): A data storage system comprising:

N servers, where  $N \geq 2$  and is an integer, each server has an index, each server includes a state machine and a local RAM, and maintains in local RAM a last time at which each servers' state changed and a value associated with the state when it last changed;

D disks, where  $D \geq 2$  and is an integer, each server in communication with each disk, each disk having a reserved disk block for each of the N servers; and

a disk arbitration mechanism where each of the N servers writes its state in its own associated disk block in each disk, and reads all the other servers' disk blocks in each disk in order to determine which server has access to, and use and control of the disks at a given time, the disk arbitration mechanism causes each server at first predetermined times to read all of the disk blocks, and write its own disk block to determine which server has access to, and use and control of the disks at a given time.

Claim 25 (previously presented): A system as described in Claim 24 wherein each server determines which of the other servers are operating by identifying which of the other servers had their state change during second predetermined times.